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PUBLIC HEALTH REPORTS

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No. 1.

MALARIAL FEVERS.

PREVALENCE AND GEOGRAPHIC DISTRIBUTION IN ARKANSAS.

By R. H. VON EZDORF, Surgeon, United States Public Health Service.

The Arkansas State Board of Health, May 16, 1913, adopted rules and regulations requiring the notification of cases of malaria. These regulations went into effect about September 1, 1913. No official records of the prevalence of the disease were therefore available in the work here reported.

This study is based upon such morbidity reports as could be collected under reply postal cards addressed to all physicians in the State of Arkansas.

The postal cards were mailed September 1, October 1, and November 1, 1913, 2,000 of them being mailed each month. The reply cards called for certain information for each of the preceding months, namely, August, September, and October, which is the period of the year when malarial fevers are said to be most prevalent.

The questions on the reply postal cards were as follows:

1. Does malarial fever prevail in your community?.....

2. How many cases have you treated during.....

Whites..... Colored.....

3. What types prevail?.....

(Tertian.) (Quartan.) (Estivo-autumnal.)

4. In how many was diagnosis confirmed microscopically?.....

(Tertian.) (Quartan.) (Estivo autumnal.)

5. How many of your cases are chronic?.....

6. What number of cases occurred in children under 15 years of age?.....

7. Are any children undeveloped, mentally or physically, on account of chronic malaria?.....

8. Do mosquitoes prevail in your community?..... What species?.....

9. Are there any swamps or poorly-drained lands in your community?.....

10. What prophylactic measures, if any, are being taken against malaria?.....

Reports were received from all of the 75 counties in the State, and in all of them malarial fevers were said to occur.

The following table gives a summary of the reports received each month:

| | August. | September. | October. |
|---|---------|------------|----------|
| Number of replies..... | 500 | 385 | 360 |
| Number of cards returned unclaimed..... | 40 | 35 | 13 |
| Number of counties represented in replies..... | 75 | 73 | 72 |
| Number of towns or cities represented..... | 297 | 231 | 232 |
| Number of cases of malaria reported..... | 9,274 | 5,266 | 3,988 |
| White..... | 6,089 | 3,840 | 2,592 |
| Colored..... | 3,185 | 2,426 | 1,400 |
| Average number of cases per physician reported..... | 18.5 | 13.7 | 11.0 |
| Number of cases of malaria confirmed microscopically: | | | |
| Tertian..... | 675 | 221 | 194 |
| Quartan..... | 129 | 80 | 27 |
| Estivo-autumnal..... | 238 | 151 | 109 |
| Number of chronic cases of malaria reported..... | 1,081 | 813 | 541 |
| Number of cases under 15 years of age..... | 3,176 | 2,617 | 1,242 |
| Number of physicians using microscope..... | 100 | 69 | 49 |

General Prevalence.

These morbidity reports indicate the wide prevalence of malaria in the State, cases having been reported from every county, the month of greatest prevalence being August, with a decline during the months of September and October. The tertian type is evidently most common.

The following table is a summary of all reports received each month, giving the number of cases, by color, in the different counties:

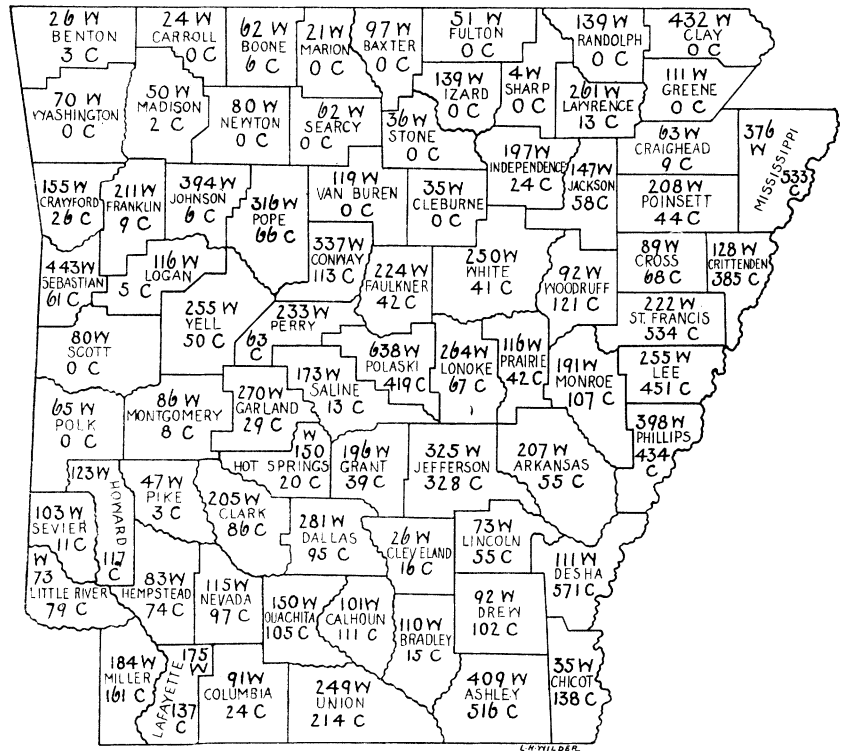
| Name of county. | August. | | September. | | October. | |
|-------------------|---------|----------|------------|----------|----------|----------|
| | White. | Colored. | White. | Colored. | White. | Colored. |
| Arkansas..... | 84 | 13 | 36 | 10 | 87 | 32 |
| Ashley..... | 135 | 58 | 165 | 424 | 109 | 34 |
| Baxter..... | 54 | 0 | 43 | 0 | 0 | 0 |
| Benton..... | 13 | 3 | 13 | 0 | 0 | 0 |
| Boone..... | 29 | 0 | 10 | 0 | 23 | 6 |
| Bradley..... | 52 | 12 | 39 | 1 | 19 | 2 |
| Calhoun..... | 9 | 4 | 7 | 2 | 85 | 105 |
| Carroll..... | 10 | 0 | 3 | 0 | 11 | 0 |
| Chicot..... | 20 | 110 | 15 | 28 | (?) | (?) |
| Clarke..... | 42 | 28 | 150 | 50 | 13 | 8 |
| Clay..... | 153 | 0 | 241 | 0 | 38 | 0 |
| Cleburne..... | 16 | 0 | 4 | 0 | 15 | 0 |
| Cleveland..... | 17 | 8 | 4 | 4 | 5 | 4 |
| Columbia..... | 17 | 5 | 70 | 17 | 4 | 2 |
| Conway..... | 159 | 59 | 19 | 1 | 159 | 53 |
| Craighead..... | 39 | 4 | 6 | 4 | 18 | 1 |
| Crawford..... | 62 | 3 | 93 | 16 | 0 | 7 |
| Crittenden..... | 50 | 100 | 74 | 227 | 4 | 58 |
| Cross..... | 24 | 6 | 8 | 28 | 57 | 34 |
| Dallas..... | 177 | 61 | 59 | 15 | 45 | 19 |
| Desha..... | 43 | 211 | 10 | 125 | 58 | 235 |
| Drew..... | 18 | 44 | 50 | 33 | 24 | 25 |
| Faulkner..... | 121 | 13 | 89 | 16 | 14 | 3 |
| Franklin..... | 85 | 6 | 66 | 3 | 60 | 0 |
| Fulton..... | 39 | 0 | 10 | 0 | 2 | 0 |
| Garland..... | 124 | 5 | 50 | 11 | 96 | 13 |
| Grant..... | 100 | 15 | 58 | 22 | 38 | 2 |
| Greene..... | 71 | 0 | 22 | 0 | 18 | 0 |
| Hempstead..... | 14 | 13 | 14 | 0 | 55 | 61 |
| Hot Spring..... | 58 | 8 | 45 | 9 | 47 | 3 |
| Howard..... | 94 | 114 | 9 | 3 | 20 | 0 |
| Independence..... | 136 | 18 | 16 | 4 | 45 | 0 |
| Izard..... | 118 | 99 | 7 | 0 | 14 | 0 |
| Jackson..... | 69 | 17 | 31 | 29 | 47 | 12 |
| Jefferson..... | 149 | 147 | 101 | 162 | 75 | 19 |
| Johnson..... | 285 | 5 | 59 | 1 | 50 | 0 |

| Name of county. | August. | | September. | | October. | |
|-------------------|---------|----------|------------|----------|----------|----------|
| | White. | Colored. | White. | Colored. | White. | Colored. |
| Lafayette..... | 24 | 61 | 52 | 33 | 99 | 43 |
| Lawrence..... | 90 | 1 | 154 | 5 | 17 | 7 |
| Lee..... | 87 | 205 | 162 | 232 | 6 | 14 |
| Lincoln..... | 31 | 18 | 25 | 22 | 17 | 15 |
| Little River..... | 46 | 37 | 14 | 28 | 13 | 14 |
| Logan..... | 87 | 5 | 7 | 0 | 22 | 0 |
| Lonoke..... | 125 | 17 | 100 | 25 | 39 | 25 |
| Madison..... | 32 | 2 | 18 | 0 | 0 | 0 |
| Marion..... | 3 | 0 | 18 | 0 | (1) | (1) |
| Miller..... | 57 | 41 | 110 | 113 | 17 | 7 |
| Mississippi..... | 197 | 291 | 105 | 185 | 74 | 57 |
| Monroe..... | 69 | 46 | 63 | 29 | 59 | 32 |
| Montgomery..... | 29 | 8 | 37 | 0 | 20 | 0 |
| Nevada..... | 2 | 1 | 28 | 18 | 85 | 78 |
| Newton..... | 25 | 0 | 25 | 0 | 30 | 0 |
| Ouachita..... | 98 | 70 | 17 | 6 | 35 | 29 |
| Perry..... | 47 | 4 | 169 | 55 | 17 | 4 |
| Phillips..... | 334 | 383 | 43 | 20 | 21 | 31 |
| Pike..... | 12 | 0 | 26 | 2 | 9 | 1 |
| Poinsett..... | 198 | 42 | (1) | (1) | 10 | 2 |
| Polk..... | 18 | 0 | 46 | 0 | 1 | 0 |
| Pope..... | 126 | 18 | 113 | 47 | 77 | 1 |
| Prairie..... | 52 | 26 | 47 | 14 | 17 | 2 |
| Pulaski..... | 365 | 151 | 185 | 131 | 88 | 137 |
| Randolph..... | 58 | 0 | 55 | 0 | 26 | 0 |
| St. Francis..... | 182 | 424 | 40 | 110 | (1) | (1) |
| Saline..... | 119 | 13 | 31 | 0 | 23 | 0 |
| Scott..... | 33 | 0 | 18 | 0 | 29 | 0 |
| Searcy..... | 52 | 0 | 6 | 0 | 4 | 0 |
| Sebastian..... | 164 | 20 | 129 | 31 | 150 | 10 |
| Sevier..... | 11 | 5 | 81 | 3 | 11 | 3 |
| Sharp..... | 3 | 0 | 1 | 0 | (1) | (1) |
| Stone..... | 15 | 0 | (1) | (1) | 21 | 0 |
| Union..... | 99 | 71 | 33 | 30 | 117 | 113 |
| Van Buren..... | 69 | 0 | 35 | 0 | 15 | 0 |
| Washington..... | 18 | 0 | 48 | 0 | 4 | 0 |
| White..... | 207 | 32 | 33 | 9 | 10 | 0 |
| Woodruff..... | 70 | 73 | 2 | 18 | 20 | 30 |
| Yell..... | 149 | 30 | 68 | 15 | 38 | 5 |
| Total..... | 6,089 | 3,185 | 3,840 | 2,426 | 2,592 | 1,400 |

¹ No report.

Map No. 1 shows the number of cases of malarial fever reported in each county for the months of August, September, and October, 1913.

MAP No. 1.—Showing total number of cases of malarial fever reported for the months of August, September, and October, 1913.



W = White. C = Colored.

Types of Infection.

The types of infection in all cases reported are given in the following table:

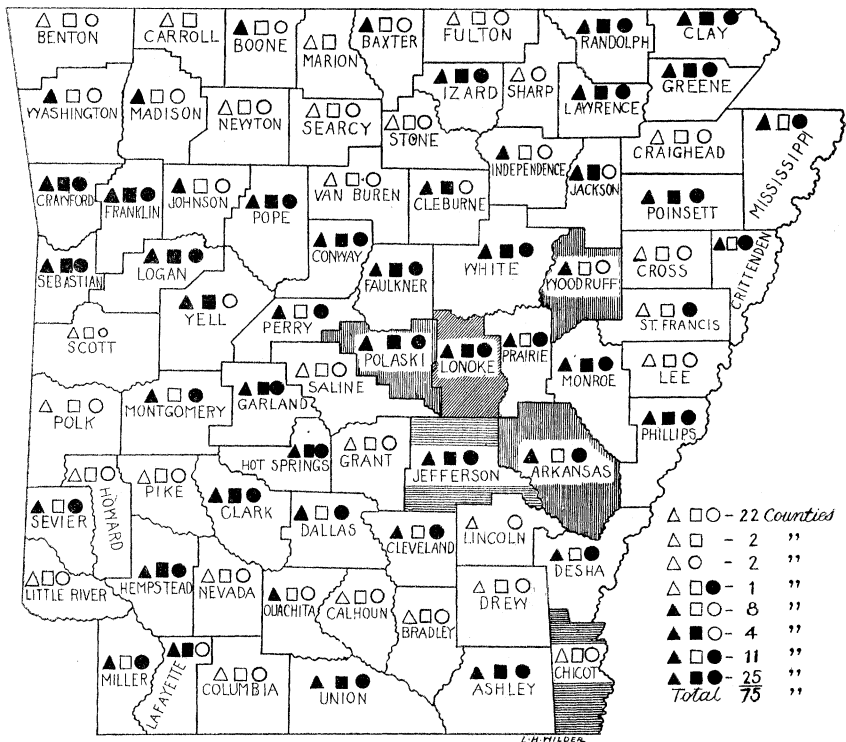
| Types. | Counties. | | |
|--|-----------|------------|----------|
| | August. | September. | October. |
| Tertian..... | 8 | 8 | 6 |
| Estivo-autumnal..... | 1 | 0 | 1 |
| Tertian and estivo-autumnal..... | 5 | 8 | 11 |
| Tertian and quartan..... | 5 | 2 | 6 |
| Tertian, quartan, and estivo-autumnal..... | 56 | 55 | 45 |
| Not stated..... | 0 | 2 | 6 |
| Total..... | 75 | 75 | 75 |

The types of infection reported confirmed microscopically, were as follows:

| Types. | Counties. | | |
|--|-----------|------------|----------|
| | August. | September. | October. |
| Tertian..... | 11 | 6 | 8 |
| Estivo-autumnal..... | 1 | 7 | 8 |
| Tertian and estivo-autumnal..... | 5 | 8 | 6 |
| Tertian and quartan..... | 4 | 4 | 0 |
| Quartan and estivo-autumnal..... | 1 | 1 | 0 |
| Tertian, quartan, and estivo-autumnal..... | 15 | 7 | 8 |
| None..... | 38 | 40 | 42 |
| No report..... | 0 | 2 | 3 |
| | 75 | 75 | 75 |

The counties in which the different types have been reported and those confirmed for the entire period, three months, are shown by symbols in the accompanying map No. 2.

MAP No. 2.—Types of infection reported.



△ = TERTIAN. □ = QUARTAN. ○ = AESTIVO-AUTUMNAL.

BLACK SYMBOLS INDICATE TYPES CONFIRMED MICROSCOPICALLY.

SHADED COUNTIES—MALARIAL INDEX OBTAINED.

Diagnosis Confirmed Microscopically.

For the month of August, 1,042 cases were reported by 100 physicians from 37 counties to have been diagnosed and confirmed microscopically; for September, 452 cases by 69 physicians from 33 counties, and for October, 330 cases by 49 physicians from 30 counties.

Chronic Malaria.

There were 234 physicians, from 66 counties, reporting 1,081 cases of chronic malarial fever in their practice for August; 161 physicians, from 60 counties, reporting 813 cases for September; and 134 physicians, from 60 counties, reporting 541 cases for October. The cases reported for the three months were from every county in the State, except the following eight: Benton, Carroll, Marion, Perry, Scott, Sharp, Van Buren, and Washington.

Children Under 15 Years of Age.

There was a total of 18,528 cases of malaria reported in the State for the 3 months, of which number 7,035 were reported to have occurred among children under 15 years of age. This represents about 38 per cent of the total number of cases reported.

Children Undeveloped, Mentally or Physically.

The reports of 109 physicians from 42 counties, for the month of August, 1913, 80 physicians from 42 counties for September, and 64 physicians from 35 counties for October, would indicate that there are children undeveloped mentally and physically on account of chronic malaria.

Mosquitoes.

Mosquitoes were reported to be present in every county in the State. The reports on the kinds of mosquitoes were as follows:

| | Counties. | | |
|--------------------------------------|-----------|------------|----------|
| | August. | September. | October. |
| Anopheles..... | 28 | 23 | 23 |
| Anopheles and Culex..... | 24 | 24 | 19 |
| Anopheles and Stegomyia..... | 5 | 1 | 1 |
| Anopheles, Culex, and Stegomyia..... | 6 | 2 | 4 |
| Culex..... | 0 | 1 | 1 |
| Unknown..... | 12 | 19 | 20 |
| No report..... | 0 | 5 | 7 |
| | 75 | 75 | 75 |

Swamps and Poorly Drained Lands.

The reports for the three months state that there are swamps or poorly drained lands existing in every county in the State, except in the following four named counties, from which all reports received were in the negative, viz, Boone, Carroll, Marion, and Sharp.

Prophylactic Measures.

From all counties except Baxter, Marion, Nevada, Newton, Polk, Sharp, and Stone, various prophylactic measures were reported as being in use, mention being made of one or more of the following: Screening, mosquito bars, drainage, oil, driven pumps instead of surface wells, quinine, education, and general sanitation. Apparently very little systematic work was being done.

The reports for August show that in 16 counties in the State no measures whatever are being used. Like reports for 19 counties for September and 19 counties for October were received.

Epidemiology.

A survey was made during part of August and September, 1913, of the geographic, climatic, social, and economic conditions prevailing, breeding places, and determination of species of *Anopheles* mosquitoes, and malarial index obtained by blood examinations from apparently healthy persons, in the following-named places:

| | |
|------------------------------|------------------------------|
| Scott, on boundary line..... | Lonoke and Pulaski Counties. |
| Pine Bluff..... | Jefferson County. |
| Lake Village..... | Chicot County. |
| Stuttgart..... | Arkansas County. |
| Augusta..... | Woodruff County. |

The malarial index includes persons living in, and in the vicinity of, the places mentioned, so that the figures are quite representative of a fair section of the counties.

The State health officer, Dr. Morgan Smith, outlined the itinerary, after considering the information to be ascertained by me in the investigation. He also arranged for the assistance and cooperation of the local physicians and health officers, and arranged for Dr. C. W. Garrison, director of sanitation and assistant State health officer, to accompany me. Dr. Garrison assisted me in all this work of collection of material and in the survey general.

Prevalence of *Anopheles* Mosquitoes.

Mosquitoes of the species *Anopheles maculipennis* were caught in houses in every place visited, except Augusta. They were found usually in the bedrooms, behind furniture, pictures, clothes, or in the dark corners of the room. It was not unusual to find them also

in the outhouses, barns, and storerooms, when sought in such places. *Anopheles punctipennis* were also found. *Anopheles crucians* is said to make its appearance late in the fall. *Anopheles maculipennis* must be considered as the species which is responsible for transmitting malarial fevers in the counties visited.

Breeding Places of Anopheles.

In all places visited, breeding places of *Anopheles* were found and the larvæ and pupæ collected. The evidence obtained in these surveys indicated that there were two general classes of breeding places to be considered, namely, those of a constant character and those of a temporary character. According to some authors, the terms "breeding places of choice" and those of "necessity" are used.

Those of a constant character are such places found along poorly drained creeks, cypress brakes, marshy places in woods, ditches, and low places in fields. The temporary places were found around or near houses and served as intermediate places between the constant source and the houses of persons, making for short flights for mosquitoes from place to place. These were such places as poorly drained ditches, gutters, barrels, pools of water overgrown with grass or other vegetation, hoof prints of cattle, and the like. It was not unusual to find *Anopheles* larvæ to be green in color when found breeding in pools of water covered with green scum or algæ. In barrels containing rain water, with dead leaves of trees or cotton seed floating on the surface and sometimes a green growth along the edges of the water, larvæ and pupæ of the *Anopheles* were found. The bearing these conditions have in the prophylactic measures must be considered, as sanitary measures recommended were to the effect that temporary breeding places must not be lost sight of in order to make for the flight of *Anopheles* as far removed from houses as is possible, and thereby to confine them to the constant source where these mosquitoes breed. The destruction of the constant source of breeding places requires a large expenditure of money and involves an engineering problem of some magnitude, thus making it impracticable to advise the undertaking of mosquito elimination for controlling malaria.

Malarial Index.

Blood smears, one thin and one thick film, were made from each person submitting himself for the examination. These were taken at random from any and all persons who were apparently in good health.

A tabulated list of the persons examined, according to age, sex, color, previous history of malaria, together with the results of the microscopic findings, is here given for each place visited:

Scott.

| Ages. | Previous history of malaria positive. | | | | Previous history of malaria negative. | | | |
|------------------|---------------------------------------|---------|----------|---------|---------------------------------------|---------|----------|---------|
| | White. | | Colored. | | White. | | Colored. | |
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. |
| 1-3 years..... | 1 | | 1 | 3 | | | 1 | |
| 4-5 years..... | 1 | 1 | 2 | 2 | | | | |
| 6-9 years..... | 4 | | 4 | 8 | | | | |
| 10-14 years..... | | 2 | 6 | 11 | | | | |
| 15-19 years..... | | | 2 | 4 | | | | |
| 20-29 years..... | | | 10 | 7 | | | 1 | |
| 30-39 years..... | 1 | 2 | 3 | 4 | | | 2 | |
| 40 or over..... | 2 | 1 | 8 | 8 | | | | |
| | 9 | 6 | 36 | 47 | | | 4 | |

Total, 102. 52 of these collected by Dr. Henry Thibault.

The examination of these gave the following results:

Estivo-autumnal infection was found in 5 and tertian type of infection in 4, making a total of 9 positive findings of the 102 examined, equal to 8.8 per cent.

The estivo-autumnal findings were found in three colored females, ages 2, 10, and 30 years, and in two colored males, ages 15 and 20 years. The tertian infections were found in one white male, age 33 years; one white female, age 31 years; one colored male, age 7 years; and one colored female, age 12 years.

This gives a relation of 1 positive finding of the 9 white males, 1 of the 6 white females, 3 of the 40 colored males, and 4 of the 47 colored females examined.

Pine Bluff.

| Ages. | Previous history of malaria positive. | | | | Previous history of malaria negative. | | | |
|------------------|---------------------------------------|---------|----------|---------|---------------------------------------|---------|----------|---------|
| | White. | | Colored. | | White. | | Colored. | |
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. |
| 1-3 years..... | | | | | | 1 | 3 | |
| 4-5 years..... | | | | | 1 | 1 | 1 | |
| 6-9 years..... | 2 | 4 | 1 | 1 | 2 | 2 | 2 | 2 |
| 10-14 years..... | 8 | 5 | 1 | 2 | 3 | 5 | 1 | 1 |
| 15-19 years..... | 1 | 2 | 4 | 5 | 4 | 1 | 1 | 2 |
| 20-29 years..... | 1 | 2 | 6 | 5 | 1 | | 1 | 2 |
| 30-39 years..... | | | | 8 | | 1 | | 1 |
| 40 or over..... | 2 | 1 | 1 | | | | 1 | 4 |
| | 14 | 14 | 13 | 21 | 11 | 11 | 10 | 12 |

Total, 106.

Of these 30 were obtained from boys and girls, pupils at the Watson Chapel Rural School, about 4 miles from Pine Bluff.

The examination of these gave the following results:

Estivo-autumnal infection was found in 3 and tertian type of infection in 7, making a total of 10 of the 106 examined, equal to 9.4 per cent.

The estivo-autumnal infections were found in 1 white male, age 5 years; 1 white female, age 8 years; 1 colored male, age 13 years. Tertian type of infections were found in two white males, ages 10 and 12 years; 1 white female, age 23 years; 3 colored males, ages 4, 20, and 28 years; and 1 colored female, age 18 years.

This gives a relation of 3 positive findings of the 25 white males, 2 of the 25 white females, 4 of the 23 colored males, and 1 of the 33 colored females examined.

Lake Village.

| Ages. | Previous history of malaria positive. | | | | Previous history of malaria negative. | | | |
|------------------|---------------------------------------|---------|----------|---------|---------------------------------------|---------|----------|---------|
| | White. | | Colored. | | White. | | Colored. | |
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. |
| 1-3 years..... | 1 | 2 | 1 | ..... | ..... | 1 | ..... | ..... |
| 4-5 years..... | 3 | 2 | ..... | ..... | ..... | 1 | ..... | 1 |
| 6-9 years..... | 7 | 5 | 1 | 2 | 5 | 3 | ..... | ..... |
| 10-14 years..... | 13 | 6 | 5 | ..... | 12 | 1 | 2 | ..... |
| 15-19 years..... | 9 | 2 | 4 | 6 | 8 | 1 | 4 | 1 |
| 20-29 years..... | 26 | 8 | 15 | 10 | 8 | 1 | 4 | 4 |
| 30-39 years..... | 16 | 4 | 24 | 12 | 11 | ..... | 4 | 1 |
| 40 or over..... | 17 | 2 | 16 | 4 | 16 | 2 | 8 | 1 |
| | 92 | 31 | 66 | 34 | 60 | 10 | 22 | 8 |

Total, 323.

There were 17 positive findings of the 323 examined, equal to 5.26 per cent. Of these, 3 were estivo-autumnal and 14 tertian in type.

The estivo-autumnal infections were found in 1 white male, age 36 years; 1 white female, age 25 years; 1 colored male, age 33 years. Tertian type of infections were found in 7 white males—2 age 4 years, 1 age 16 years, 1 age 19 years, 2 age 24 years, and 1 age 26 years; 4 colored males—ages 23, 30, 31, and 32 years; 3 colored females—ages 34, 38, and 39 years.

This gives a relation of 8 positive findings of the 152 white males, 1 of the 41 white females, 5 of the 88 colored males, and 3 of the 42 colored females examined.

This is rather a low percentage of findings for a highly malarious district, as Lake Village and vicinity was found to be. A closer study of the remaining 306 histories taken will be of interest. There were 205 of these who give clear and positive history of attack of malarial fever, ranging from one week to one year before the blood

specimen was taken, and the most of these during the summer. Of the 205, 96 had taken quinine any time between the time when seen and two months before, the statements in the history being: "Taking quinine now," "Took quinine a few days ago," or "One week ago," or "Two weeks ago," or "One month ago," "Two months ago," "Quinine being administered now," "Taking medicine now." This left 109 of those giving positive histories who had not recently taken quinine. Of the negative histories, 2 were taking quinine and 99 were not under treatment.

If we eliminate the 101 giving a negative history and the 96 who had only recently taken quinine, which more than likely affected the blood findings, the result of this blood examination then shows 17 positive findings out of a total of 126 persons who were well but who had had malarial fever at some time, which equals 13.5 per cent. From all data available, 13.5 per cent more fairly represents the actual condition.

Stuttgart.

| Ages. | Previous history of malaria positive. | | | | Previous history of malaria negative. | | | |
|------------------|---------------------------------------|---------|----------|---------|---------------------------------------|---------|----------|---------|
| | White. | | Colored. | | White. | | Colored. | |
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. |
| 1-3 years..... | | | | | | | | 1 |
| 4-5 years..... | | | | | 1 | | | |
| 6-9 years..... | 4 | 2 | 2 | | 5 | 1 | 2 | |
| 10-14 years..... | 5 | 3 | 5 | | 7 | 1 | 4 | 1 |
| 15-19 years..... | 3 | 1 | 7 | 2 | 6 | 1 | 4 | |
| 20-29 years..... | 1 | 2 | 6 | 3 | 9 | 1 | 6 | 2 |
| 30-39 years..... | 1 | 1 | 3 | 1 | 1 | 1 | 2 | |
| 40 or over..... | 5 | 1 | 2 | | 2 | | 3 | |
| | 19 | 10 | 25 | 6 | 31 | 5 | 21 | 4 |

Total, 121.

There were 10 positive findings of the 121 examined, equal to 8.2 per cent.

The findings were estivo-autumnal type of infection, in 3, as follows: 1 white female, age 14; 1 colored male, age 34; and 1 colored female, age 3 years. Tertian type of infection was found in 7, as follows: 2 white males, ages 9 and 12 years; 1 white female, age 13; 3 colored males, ages 21, 28, and 48; and 1 colored female, age 14 years.

This gives a relation of 2 positive findings among the 50 white males, 2 of the 15 white females, 4 of the 46 colored males, and 2 of the 10 colored females examined.

Augusta.

| Ages. | Previous history of malaria positive. | | | | Previous history of malaria negative. | | | |
|------------------|---------------------------------------|---------|----------|---------|---------------------------------------|---------|----------|---------|
| | White. | | Colored. | | White. | | Colored. | |
| | Male. | Female. | Male. | Female. | Male. | Female. | Male. | Female. |
| 1-3 years..... | | | | | 1 | 1 | | |
| 4-5 years..... | 1 | 1 | | | 1 | | | |
| 6-9 years..... | 4 | | 2 | | 3 | 1 | | |
| 10-14 years..... | 7 | | 5 | | 5 | | 3 | |
| 15-19 years..... | 9 | | 1 | 1 | 3 | | 2 | |
| 20-29 years..... | 19 | | 5 | 1 | 4 | | 5 | |
| 30-39 years..... | 9 | 2 | 2 | 1 | 6 | 1 | | 1 |
| 40 or over..... | 22 | | 7 | 1 | 6 | 2 | 5 | |
| | 71 | 3 | 22 | 4 | 29 | 5 | 15 | 1 |

Total 150.

There were 7 positive findings of the 150 examined, equal to 4.66 per cent. The examination of these gave the following results: Estivo-autumnal types of infection were found in 4 as follows: 3 white males, ages 10, 16, and 28 years; 1 colored male, age 30 years. Tertian type of infection was found in 3 as follows: 2 white males, ages 10 and 46 years; 1 colored male, age 60 years. This gives a relation of 5 positive findings among 100 white males, 2 among 37 colored males, and none among 8 white females and 5 colored females examined.

Summary Report of Malarial Index in Arkansas.

| Place. | Examined. | | Total. | Number infected. | | Per cent. | Types. | |
|-------------------|-----------|----------|--------|------------------|----------|-----------|----------|------------------|
| | White. | Colored. | | White. | Colored. | | Tertian. | Estivo-autumnal. |
| Scott..... | 15 | 87 | 1 102 | 2 | 7 | 8.80 | 4 | 5 |
| Pine Bluff..... | 50 | 56 | 106 | 5 | 5 | 9.40 | 7 | 3 |
| Lake Village..... | 193 | 130 | 323 | 9 | 8 | 5.26 | 14 | 3 |
| Stuttgart..... | 65 | 56 | 121 | 4 | 6 | 8.20 | 7 | 3 |
| Augusta..... | 108 | 42 | 150 | 5 | 2 | 4.66 | 3 | 4 |
| | 431 | 371 | 802 | 25 | 28 | 6.60 | 35 | 18 |

¹52 obtained by Dr. Henry Thibault.

Acknowledgments.

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THE FULL-TIME HEALTH OFFICER.

HIS IMPORTANCE IN LOCAL HEALTH ADMINISTRATION AND IN THE ADVANCEMENT OF RURAL HYGIENE.

An address delivered before the State Conference of Health Officers of Kentucky, at Louisville, December 8, 1913.

By LOUIS I. DUBLIN, M. D., statistician, Metropolitan Life Insurance Co.

The State of Kentucky presents a condition of lively interest to the student of health and sanitation. As a State it is among the most typically American in the country. According to the 1910 census you had a population of 2,290,000, of whom about 98 per cent were native born. You have, therefore, no serious problems of assimilating the foreigners in your midst, as we have in the East. The State of New York, for example, has 30 per cent of its total population foreign born, many of whom have come here more or less recently from southern or eastern Europe. Furthermore, over 75 per cent of your population live in rural territory or in small communities of less than 2,500 inhabitants. Your population is, therefore, homogeneous. You live in the country and are free from congestion and those other unfavorable conditions of industrial and urban life which make the health problems of many of our States so acute.

The situation in Kentucky is interesting in another respect. You have upon your statute books a good health law, which provides the necessary machinery for your health work. You have also a model law for the registration of births and deaths and you have been admitted to the registration area. In other words, you have what, to a stranger like myself, would appear to be a very favorable condition for efficient health administration, namely, a population not too large, of good native stock, thoroughly imbued with American ideals, and, secondly, adequate statutory provision to make your sanitary control both sure and efficient.

It is therefore not surprising that health experts look to Kentucky for an encouraging example. They are anxious to learn whether you are ready to take full advantage of your fine opportunities; whether you will make continuous advances in health conditions and perhaps be able to solve for other States some of the vexing problems of rural